TECHNICAL NOTES

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Five-Year Results in an Aspen Sucker Density Study

Aspen thinning studies have been under observation for a number of years to determine optimum stocking levels for this species. These experiments, however, have dealt mainly with stands over 10 years of age, and have left unanswered the question of how stand density may influence growth and development during the first 10 years.

To get information on this point, a controlled density study was installed in 1952 in a 1-year-old stand of aspen suckers on the Pike Bay Experimental Forest in north central Minnesota. The suckers had arisen following commercial clear cutting of the parent stand (site index 70 to 75) in the fall and winter of 1950. In July of 1951 all non-merchantable residual aspen and hardwoods were removed to avoid their causing irregularities in the sucker stand.

The study involves 5 levels of stocking and 3 replications. Data are obtained by measuring sucker reproduction on fifteen 1/20-acre circular plots, with suckers individually staked except on the three check plots.

The per-acre stocking levels are 260,[1/] 500, 1,000, and 1,500 stems, and a check area which averaged about 10,060 stems. New suckers came up in 1953 and 1954 on all plots. They were removed annually except on the check plots. In 1954 new suckering was much diminished and by 1956 it had virtually ceased. This re-sprouting characteristic, especially in the first 2 or 3 years, represents a problem in the control of stand density at an early age.

Survival and height growth data by treatments are given in table 1.

Table 1.--Survival and height growth of aspen suckers under various stocking levels

Treatment: stems left per acre, 1952 [1/] (number)	Stems per acre 1956	Survival[2/]				Average height	
		1953	1954	1955	1956	1952	1956
	Number	Percent				Feet	
260	240	94.9	92.3	92.3	92.3	4.2	10.4
500	440	97.3	97.3	88.0	88.0	3.0	6.9
1,000	913	98.7	96.0	91.3	91.3	3.6	9.8
1,500	1,253	94.7	90.3	85.8	83.5	4.4	9.7
10,060(check)	5,600	66.1	69.4	64.4	55.7	2.4	8.0

1/ Maintained at this level annually on all except check plots by removing new suckers.

2/ Percent of the original number of stems.

1/ 260 was chosen instead of 250 to avoid having 12½ trees per 1/20 acre.

In 1953 (1 year after treatment) survival ran 94.7 percent or better on all treatments except the check which had only 66.1 percent of the original number of stems even though the count included some new suckers. Reduction in number of stems on the check area is, of course, desirable and fully expected. In the spring of 1954 survival still ran better than 90 percent on all thinned plots. The check had gained slightly over the previous year due to additional new suckers, which more than offset the mortality among older suckers. By 1956 survival on the check area had dropped to 55.7 percent, whereas the 260-stems-per-acre level still maintained survival at 92.3 percent.

Survival on the thinned areas is of greater importance than on the check area because sizable losses after thinning could reduce the stand to the point where future production might suffer. Thus far no serious losses have occurred.

Average heights differed considerably in 1956 between the various treatments, but much of this height variation existed at the start of the experiment. Based on observations to date, no differences in height can be attributed to treatment.

Both numerically and percentagewise there are more small weak suckers on the check plots than on the thinned plots because the larger, more vigorous suckers were favored in the thinning whenever spacing considerations permitted this. However, the check area also has the largest number (though not percent) of tall stems. There are 952 stems per acre over 10 feet in height on the check area as compared to a maximum of 590 per acre on the thinned plots.

In summary, this study indicates that during the first 5 years stand density has little effect on the height growth of aspen, survival of aspen suckers decreases with increasing stand density, and when aspen stands are thinned immediately after establishment additional suckering can be expected for at least 3 years.

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